

REMARKS

Applicant has amended claims 1 and 23 to highlight that the step[of removing some metal from the structured metal layer takes place after the application of the brazing resist to the structured metal layer.

In general, it is correct to state that US 5,981,036 (Schulz-Harder) teaches the process comprising the steps

a) applying at least one copper foil to at least one surface side of the ceramic layer by high temperature bonding at a bonding process temperature higher than 650°C for forming at least one metal layer on the ceramic layer,

b) structuring the metal layer on at least one surface side of the ceramic layer for forming the structured metal layer with conductive tracks and contact surfaces.

Further, as indicated in the action, US 5,981,036 (Schulz-Harder) does not teach the brazing resist.

However, crucially US 5,981,036 (Schulz-Harder) does not teach “removing some metal from the structured metal layer in an amount of 0.1 – 20 microns in surface areas bordering the brazing resist coating”, as set forth in independent claims 1 and 23, and especially not contemplate or teach “removing some metal from the structured metal layer after applying the brazing resist coating to the structured metal layer.” This is clear in limitation (d) of the Independent claims.

Further, the Examiner is correct in stating that US 5,756,377 (Ohsawa) does not teach a method with the aforementioned method steps a) and b) and also correct in saying that the terms “brazing resists” and “soldering resists” are variants of each other.

The Examiner is misinterprets the disclosure of US 5,756,377 (Ohsawa) in alleging that the document teaches applying at least one coating of brazing resist to structured metal layer after structuring and then (that means after the brazing resist had been applied to the structured metal layer) removing some metal from the structured metal layer ... in surface areas bordering the resist coating.

In connection with the figures 3A – 3K, US 5,756,377 teaches a rather complicated method of producing a lead frame for semiconductor chips 4. In general, this method comprises the following steps:

- ☐ Preparing a base 9 in form of a free-layer laminated plate comprising a substrate of copper 10 a thin aluminium layer 11 applied to the substrate and a thin copper layer applied to the aluminium layer 11 (figure 3A).
- ☐ Forming leads 3 on the surface of the copper film 12 by electrolytic plating (figure 3B).

- Adhering a member laminated with a protective insulating film 1 and a reinforcement plate 5 to the base 9 on the surface on which the leads 3 are formed (figure 3c).
- Etching the copper substrate 10 such that it forms a frame structure 9 (figure 3D).
- Selectively removing the aluminium film 11 and the copper film 12 in between the leads 3 by edging so that electrical short cuts in between the leads 3 are removed. During this step the thin copper film 12 which is used as a ground coat for electrolytic plating for forming the leads is eliminated by edging by 2 μm (figure 3E).
- After removing the aluminium film 11 and the copper film 12 a solder resist 6 is applied to the leads (figure 3F).
- After applying the solder resists 6 the semiconductor chip 4 is bonded to the leads 3 and the semiconductor chip 4 as well as the lead frame are sealed with a resin 8 and embedded in this resin and the unnecessary part of the copper base 10, namely the frame structure 9 is removed (figures 3G – 3K).

Apart from the fact, that this method of US 5,756,377 is completely different from the inventive method, as disclosed and claimed in the present application, and that already for this reason it is not evident why a person skilled in art should be able in principle to transfer steps of the known process to a completely different process of the invention, US 5,756,377 actually does not teach “removing metal from the structured metal layer after the brazing resist had been applied to the structural metal layer” and further this document does not teach “removing the metal in amount of 0.1 – 2 microns.” These are key features of the present claims!

The Examiner refers to column 7, line 1 of US 5,756,377. However the teaching of this passage is quite clear, namely the edging referred to in this passage is a part of the structuring step for forming the leads 3 which are separated from another not before this etching step or the etching the copper film 12 had been performed. This etching step of the known process could only be compared with step b) of the inventive process (structuring the metal layer for forming conductive tracks or leads and contact surfaces). Furthermore US 5,756,377 does not teach etching after applying the brazing resist or soldering resist.

The claimed inventive process focuses on “removing of metal of the structured metal layer in the amount of 0.1 – 20 microns after the brazing resist had been applied to the structured metal layer” and has nothing to do with the step for structuring the metal layer for forming the conductive tracks or conductive surfaces, but removing of some metal on the surface of the structured metal layer in areas bordering the brazing resist coating improves the effect of the brazing resists.

After removing the level of the metal surface bordering, the brazing resist layer is somewhat lower than the level of the surface of the brazing resist and not higher than the level of the

surface of the brazing resist even if a further metal coating, for example a nickel coating is applied to the metal surface bordering the racing resist layer, so that during a soldering operation the effect of the brazing resist, namely preventing soldering material from flowing over the soldering resist will be supported by the level of metal surface being lower than the brazing resist surface, and at least not higher than the brazing resist surface.

In this connection, we again refer to the figures 4 and 5 of this application and to the corresponding description in the specification.

Reconsideration of the refusal to allow claims 1-23 as presently clarified and presented is requested.

Respectfully submitted,



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